

Amendment under 37 CFR §1.111
Attorney Docket No.: 031212
Application No.: 10/669,713

REMARKS

Claims 11-27 are pending in the present application. Claims 1-10 are herein cancelled.

Claims 11-27 are newly added. No new matter has been entered.

Claim 11 is supported by original claim 1 and Examples 3, 4, 7 and 8 in the specification.

Claim 12 is supported by original claim 1 and Examples 3-6 in the specification. Claim 13 is supported by Examples 3 and 4 in the specification. Claims 14 and 15 are based on claim 3.

Claims 16 and 17 are based on claim 4. Claims 18 and 19 are based on claim 5. Claims 20 and 21 are based on claim 6. Claims 22 and 23 are based on claim 8. Claims 24 and 25 are based on claim 9. Claims 26 and 27 are based on claim 10.

Claim Rejections - 35 U.S.C. § 103

Claims 1 and 3-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Hamrock** (US 6,063,522) in view of **Sano** (US 2002/0086 191) and **Funatsu** (US 5,478,673); claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over **Hamrock** in view of **Sano** and **Funatsu**, and further in view of **Takahashi** (US 5,766,791); claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over **Hamrock** in view of **Sano** and **Funatsu**, and further in view of **Sakai** (US 2001/0122984); and claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Hamrock** in view of **Sano**, **Funatsu** and **Sakai**, and further in view of **Takahashi**.

Favorable reconsideration is requested.

(1) Applicants respectfully submit that Hamrock in view of Sano and Funatsu does not teach or suggest “the main component being 97% to 100% in volume of the non-aqueous

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solvent" as recited in claim 11 and "the non-aqueous solvent includes propylene carbonate, the propylene carbonate being a subsidiary component" as recited in claim 12.

The Office Action acknowledged that Hamrock does not teach a subsidiary component of the non-aqueous electrolyte in the amount of less than 100% by volume. (Office Action, page 4.) The Office Action cited Funatsu for teaching this feature.

Funatsu discloses a mixed solvent which comprises ethylene carbonate (cyclic carbonate) in an amount of 5 to 40% by volume and chain ethers in an amount of 60 to 95% by volume. However, Funatsu does not disclose that a mixed solvent which comprises chain ethers represented by the recited general formula (1) in an amount of 97% or more by volume (*i.e.* 3% or less by volume of cyclic carbonate), and that propylene carbonate is used as cyclic carbonate. Therefore, Hamrock in view of Sano and Funatsu does not teach the noted features of claims 11 and 12 and these features would not have been obvious.

(2) Applicants respectfully submit that the present invention as recited in the claims would not have been obvious over Hamrock in view of Sano and Funatsu because the present invention as recited in the claims provides unexpected results over the cited references.

Applicants previously cited data submitted in a declaration submitted with the Amendment of August 5, 2008 in which data providing results of additional comparative examples were submitted and combined with the existing Examples and Comparative Examples. The declaration included graphs showing discharge capacity and swelling for the different examples and concluded that the significant difference in the data trends demonstrates the unexpectedly improved results of the present invention as recited in the claims.

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In response, the Office Action presented different graphs using the same data. The Office Action combined all the data (Examples and Comparative Examples) and preformed a linear regression to conclude that “a predictable result occurs.” (Office Action, page 10.) The Office Action also stated “if anything, the results at the data point of 70% DGM are unexpected, while the results within 80% to 100% DGM are predictable. (Office Action, page 10.)

Applicants respectfully submit that the analysis in the Office Action of the comparative data and data from the present invention is incorrect. The Office Action performed a linear regression of all of the data (comparative data and the data resulting from examples of the present invention). However, the proper analysis is to compare what was known in the art with results from the present invention and determine whether or not the results of the present invention would have been expected based on what was known in the art. The issue that the must be analyzed is whether from what was known in the art would one of ordinary skill in the art expect the results obtained from the present invention. If a linear regression analysis of the data is used, then the proper analysis is to perform a linear regression on the comparative data and compare that with a linear regression of the results from the present invention. The question then becomes, from the linear regression analysis of data using what was known in the art, would one of ordinary skill in the art expect the results obtained using the present invention.

From graphs 1 and 2 from the declaration it can be seen that the data from the present invention provides a large difference in the trend of the data as compared to the comparative data. Based on the comparative data (results from what was known in the art), one of ordinary skill in the art would not expect the improvement shown by the data from the present invention. This

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can be seen by extending the linear regression from the comparative data. One of ordinary skill in the art would expect the trend to continue based on this extension of the linear regression. However, contrary to what one of ordinary skill in the art would expect, the slope of the data from the present invention shows a significant change. Thus, the results from the present invention are an unexpected improvement over the prior art.

Regarding the statement in the Office Action that “if anything, the results at the data point of 70% DGM are unexpected,” Applicants also respectfully submit that this conclusion is an incorrect analysis of the data. As noted above, the issue is whether from what was known in the art would one of ordinary skill in the art expect the results obtained from the present invention. Even more specifically, the analysis includes what was known in the art *as a whole*. MPEP 2141.03(VI). It is improper to pick and choose the data most favorable to the analysis of the Office. The data point of 70% DGM is part of what was known in the art. The linear regression trend lines in the graphs on pages 9 and 10 of the Office Action incorrectly do not take into account the data at 70% DGM. These linear regression lines are based on all of the data except for the data point of 70% DGM. Thus, the Office Action incorrectly disregards data from what was known in the art.

Applicants respectfully submit that the present invention provides unexpected results as noted above and as pointed out in the Amendment of August 5, 2008 with support from the declaration submitted with the amendment. Applicants also request reconsideration of the analysis provided in the Office Action at pages 8-10 taking into account the comments above.

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(3) Applicants respectfully submit that Hamrock in view of Sano and Funatsu and further in view of Takahashi does not teach or suggest “the insulating gasket has a melting temperature more than 185°C” as recited in claims 20, 21, 24 and 25.

The Office Action acknowledged that Hamrock in view of Sano and Funatsu does not teach the battery casing assembly of claims 6 and 9. (Office Action, pages 6 and 8.) The Office Action cited Takahashi for teaching this feature. The Office Action acknowledged that Takashi does not explicitly teach the melting temperature of the gasket. (Office Action, pages 6 and 8.) The Office Action takes the position that the gasket would inherently have a high melting temperature in order to function properly. (Office Action, pages 6 and 8.)

However, the characteristics of the explosion proof valve are set based on the intended design of the battery. (*See* Col. 11, lines 28-32.) Thus, just because the battery has an explosion proof valve to protect against an increase in internal pressure, does not mean that the melting temperature of the gasket must be high and does not necessarily mean that the melting temperature must be more than 185 °C.

Furthermore, when the temperature of the battery is increased, a low-boiling solvent begins to vaporize around more than 80°C. As the temperature rises, the amount of vapor dramatically grows, and thus the inner pressure of the battery rapidly increases. In order to secure the safety of the battery, the safety valve is required to work in the early stages of the increase of the inner pressure. For this reason, the safety valve is designed to work at about 100-150°C. Thus, it would only be necessary for the gasket to have a property to keep its shape up to about 150°C, and is not necessary to have a melting temperature over 185°C. Therefore, the

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cited references do not teach or suggest, either expressly or inherently, the above-noted feature of claims 20, 21, 24 and 25, and this feature would not have been obvious.

For at least the foregoing reasons, claims 11-27 are patentable over the cited references. Accordingly, withdrawal of the rejections of the claims is requested.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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